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Via E-Mail

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Subject: AK Steel Dearborn Works – Civil Action No. 15-cv-11804
DJ # 90-5-2-1-10702

In accordance with the Consent Decree in the above-referenced action, attached is a supplement to the Paragraph 20 report regarding review of Continuous Opacity Monitoring (COM) data for the first quarter of 2019 to further describe preventative actions, as requested by EPA's letter dated June 27, 2019. If you have any questions regarding this report, please contact Jim Earl at 313-845-3217.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

LaDale Combs
General Manager, Dearborn Works

Report on Preventative Actions for Basic Oxygen Furnace Electrostatic Precipitator

Consent Decree in Civil Action No. 15-cv-11804, August 21, 2015

I. Introduction

Pursuant to Paragraph 20 of the above-identified Consent Decree, AK Steel is required to submit a quarterly report that includes each instance where the 6-minute block average reading of the COM data exceeds 20%. For each such event the report must include the root cause, corrective actions and preventative actions.

In response to AK Steel's first quarter 2019 report, U.S. EPA requested via letter dated June 27, 2019, that AK Steel provide additional information on its preventative actions. U.S. EPA requested this information in order to make a determination under Paragraph 22 of the Consent Decree.

The following report provides an overview of the Dearborn Works BOF ESP, a summary of recent repair and maintenance work on the ESP, and a scope of work and tentative schedule for the rebuild of the ESP.

II. Overview of Dearborn Works BOF ESP

The Dearborn Works operates two 250-ton Basic Oxygen Furnaces (BOFs) – A Vessel and B Vessel. Emissions from each of the BOF vessels are collected by either a charge hood, primary hood, and/or a tapping hood depending on the specific operation within the steel production cycle. The primary hood captures primary emissions from oxygen blowing, and exhausts to an Electrostatic Precipitator (ESP) to control particulate emissions.

The path of the exhaust gas for each BOF is through the primary hood where water sprays are activated by off gas temperature to cool the gas and then to an evaporator chamber. Ductwork referred to as the Wye Section connects each individual evaporation chamber to the common downcomer. Louvers are situated within each leg of the Wye section to control flow through each of the individual primary hoods. The common downcomer ductwork connects the Wye Section to the inlet housing for the ESP. The inlet housing is the entry point of emissions into the actual ESP itself. The gas then flows through the ESP, to induced draft (ID) fans and out the stack.

The ESP itself is comprised of four ESP casings arranged in parallel. Each ESP casing contains two gas tight compartments, for a total of eight ESP compartments. Each of the eight compartments contain four fields that include collector plates and discharge electrodes. The exhaust gas is subject to an electrical charge from electrodes, and the charged entrained particles in the exhaust gas are drawn onto the collector plates. These collector plates are then periodically knocked or "rapped" to dislodge the particulate, which is collected in dust hoppers and sent to a dust handling system.

III. Summary of Recent Repair and Maintenance Work on ESP and Associated Components

AK Steel and its predecessor have continually assessed the ESP and its associated components for purposes of identifying repair and maintenance needs. Following is a summary of such repairs and maintenance projects from the past 8 years.

A. 2012-2014 Repair Projects

Between 2012 and 2014, substantial repairs were made to the ESP and associated components. These repairs included the following:

- The collector plate bottoms were repaired due to deterioration that caused reduced clearances within the ESP that promoted sparking, affecting the power levels.
- Extensive patching was applied to areas of the inlet manifold and roof/casing walls to address excess air inleakage.
- Defective rappers were replaced.
- High voltage support frames and plate supports were replaced to allow the ESP collector plates to be realigned.
- The Automatic Voltage Controls software was upgraded to the latest available version.
- The ESP ID Fans were replaced.
- The water spray system was further tuned.
- The inlet turning vanes directing flow into the compartments were rebuilt.

B. 2016-2018 Repair Projects

Between 2016 and 2018, additional substantial repairs were completed on the ESP and associated components, focused on minimizing air and water inleakage into the gas conditioning system, among other repairs. These repairs included the following:

- All discharge electrodes were replaced due to a high incidence of broken wires that were grounding out fields.
- The boiler tubes within both the A-Vessel and B-Vessel primary hoods were replaced due to leaks in the tubes that had been identified as a possible contributor to corrosion within the ESP.
- An outer shell was built around the upper portion of the downcomer duct to reduce the amount of air inleakage within the capture system.
- The B-Vessel Wye Section Leg was completely replaced which further reduced air inleakage within the system.
- Sections of plates and wires were removed out of certain compartments to stabilize the compartment by removing areas where close clearances were occurring.

C. Ongoing Maintenance Work

In addition to specific repairs, AK Steel regularly conducts extensive maintenance on the ESP as part of its general Operation and Maintenance Program. The typical maintenance cycle has involved (but is not limited to) the following, as needed based on inspections:

- Checking and cleaning/replacing insulators.
- Checking rappers and rapper support equipment (mountings, rapper boot seals, rain shields) for proper operation and replacing.
- Inspection and replacement of inlet turning vanes.
- Patching areas of inleakage.
- Inspection and replacement of bottom plate stiffeners.
- Inspection and replacement of defective plate supports.
- Adjustment to collection plate alignment.
- Inspection and Replacement of discharge electrodes (wires).
- Replacement of failed TR sets.
- Removal of wires grounding fields.
- Upgrading of software to the most current versions.

IV. Scope of Work for Current ESP and Associated Component Replacements

None of the above repairs involved the replacement of the key components of the ESP, namely the collector plates, power supplies, electrical controls, and the general structure. The prior repairs have been focused on maintaining the alignment of the plates within the ESP compartments, maintaining the ancillary items that are needed for the ESP to work properly (rappers, turning vanes, electrodes, and insulators to name a few), and on improving the gas conditioning by optimizing water sprays and reducing air inleakage.

The work that AK Steel intends to start this fall represents the first phase of a project that will replace the key components of the ESP. Following is a summary of AK Steel's intended plan to rebuild the ESP and its associated components, and the anticipated timing of the work. Note that this scope of work and anticipated timing is subject to change as AK Steel continues to assess this substantial project. The expected costs of the below scope of work is estimated in excess of $70 million.

A. Fall 2019 Expected Scope of Work

During the fall 2019 outage, AK Steel intends to: (1) replace the A-Vessel Wye Section Leg and associated louvers and isolation guillotine (the B Vessel Wye Section Leg was previously replaced); (2) replace the entire downcomer and the transition from the upper spark box to the downcomer; and (3) install the new inlet and outlet ductwork manifolds, turning vanes, and dampers. By the end of the fall outage, everything from the start of each Wye Section leg to the inlet housing of the ESP will be new.

B. 2020 Expected Scope of Work

In 2020, AK Steel intends to install a ninth ESP compartment. Once this compartment is online, it will allow AK Steel to proceed with the ESP rebuild while still performing the needed maintenance on the other compartments. This additional compartment will provide the short-term benefit of having additional control capacity during the more technically difficult stages of the rebuild project. In addition, the additional compartment will also provide a long-term benefit in that the compartment will be utilized after the rebuild is complete.

C. 2021 Expected Scope of Work

In 2021, AK Steel intends to rebuild two ESP compartments. This rebuild will consist of the complete demolition of the compartment including the base shell, replacing the casing, adding new collection plates, and adding new controls. Essentially, the compartment will be completely gutted and then replaced/rebuilt with new equipment.

D. 2022 Expected Scope of Work

In 2022, AK Steel intends to rebuild two additional ESP compartments. This will result in five new compartments (the four rebuilt compartments and the new "ninth" compartment).

E. Future Expected Scope of Work

After the completion of the intended 2022 scope of work, AK Steel intends to evaluate the performance of the ESP. Based on the ESP performance, AK Steel will establish the timing of the rebuild for the remaining compartments.